Reservation Nonemployer and Employer Establishments: Data from U.S. Census Longitudinal Business Databases

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Abstract

The presence of businesses on American Indian reservations has been difficult to analyze due to limited data. Akee, Mykerezi, and Todd (AMT; 2017) geocoded confidential data from the U.S. Census Longitudinal Business Database to identify whether employer establishments were located on or off American Indian reservations and then compared federally recognized reservations and nearby county areas with respect to their per capita number of employers and jobs. We use their methods and the U.S. Census Integrated Longitudinal Business Database to develop parallel results for nonemployer establishments and for the combination of employer and nonemployer establishments. Similar to AMT's findings, we find that reservations and nearby county areas have a similar sectoral distribution of nonemployer and nonemployer-plus-employer establishments, but reservations have significantly fewer of them in nearly all sectors, especially when the area population is below 15,000. By contrast to AMT, the average size of reservation nonemployer establishments, as measured by revenue (instead of the jobs measure AMT used for employers), is smaller than the size of nonemployers in nearby county areas, and this is true in most industries as well. The most significant exception is in the retail sector. Geographic and demographic factors, such as population density and per capita income, statistically account for only a small portion of these differences. However, when we assume that nonemployer establishments create the equivalent of one job and use combined employer-plus-nonemployer jobs to measure establishment size, the employer job numbers dominate and we parallel AMT's finding that, due to large job counts in the Arts/Entertainment/Recreation and Public Administration sectors, reservations on average have slightly more jobs per resident than nearby county areas.

Keyword*:* Entrepreneurship, American Indians, Rural Communities, Economic Development

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1. Introduction

Akee, Mykerezi, and Todd (2017; hereafter AMT) compare the spatial density of nonfarm employer establishments on federally recognized American Indian reservations to their density in nearby county areas.[1] To contribute to a more complete picture of the spatial density of work activity on reservations, this paper extends AMT's methods to nonemployer establishments and to the combination of employer and nonemployer establishments. We create the first comprehensive dataset on reservation nonfarm nonemployer business establishments (such as sole proprietorships, that have no workers for whom the business reports Social Security contributions or withholds income taxes[2]). To do that, we geocode (i.e., assign longitude and latitude coordinates to) the address of almost every nonemployer establishment in the 2010 Integrated Longitudinal Business Database (ILBD) and then use these location coordinates to create new variables that identify whether an establishment is located on an American Indian reservation (and if so, which one).[3]

The resulting dataset allows us to provide an initial description of the nonfarm nonemployer segment of the reservation economy, in terms of sectoral distribution, per capita nonemployer establishment counts, and the per capita amount of revenue generated by reservation nonemployer establishments. We find that, on average across 17 industries, reservations have a similar sectoral distribution of nonfarm nonemployer establishments but a significantly smaller number of these establishments per capita than in adjacent county areas, overall and in most individual sectors. Measuring by revenue instead of establishment numbers reveals less similarity in the sectoral composition of reservations and county complements. For example, on average across the reservations and counties we examine, the Retail sector

[1] For background and motivation of the work in AMT and this paper, see AMT's discussion of the historical factors that have caused many American Indian reservations to have, by national standards, lower levels of human capital, poorer housing stocks, and lower incomes or to differ in key socio-economic dimensions from nearby nonreservation counties. They also review how it has been difficult to assess the extent to which these factors have hindered businesses on American Indian reservations due to the lack of data on reservation businesses. This paper is primarily an extension of AMT's work on nonfarm nonemployer business establishments.

[2] Nonemployers make up the majority of businesses in the U.S, according to Davis et al. (2007). They report (p. 8) that as of 2000 there were about 15.5 million nonemployer businesses, including about 13.4 million sole proprietorships with no employees and about 2.1 million organized as corporations, partnerships and other business entities with official Employer Identification Numbers but no employees), and about 5.4 million employer businesses. However, they also find that nonemployer businesses account for just 4 percent of aggregate revenue.

[3] The ILBD data on nonfarm nonemployer establishments come mainly from income tax returns (Davis et al. 2007, p. 5 and Table 1). For nonemployers, we can use the terms "business" and "establishment" interchangeably because nonemployer businesses are assigned just one location in the ILBD. By contrast, employer firms in the LBD may have multiple locations with employees, each of which would be reported as a distinct establishment. To facilitate our combined analysis of nonemployer and employer data, we adopt the term "establishment" for both nonemployers and employers. For convenience, we also sometimes drop the "nonfarm" qualifier, but neither the ILBD nor the LBD include data on farms.

generates a much higher percentage of nonemployer revenues on reservations. However, overall revenue per capita on reservations is lower than in nearby county complements.

By combining our results for nonemployers with AMT's results for employers, we can compare reservations and nearby county areas in terms of the combined number of employer-plus-nonemployer establishments and jobs (assuming one job-equivalent per nonemployer). The distribution of establishment numbers across sectors is similar between reservations and counties, which is not surprising since it holds for employer and nonemployer establishments separately. Because most of the combined jobs numbers we measure are at employer establishments, our results for employer-plus-nonemployer jobs parallel AMT in showing that the distribution across sectors is distinctly different between reservations and counties. Results for the number of combined employer-plus-nonemployer establishments per person are not surprising. Combined establishment counts per person are distinctly lower on reservations (as was true for employers and nonemployers separately). However, there are somewhat more employer-plus-nonemployer jobs per person on reservations, in line with AMT's parallel finding for employer firms and the fact that employer firms dominate total job numbers.

To consider how reservation-county differences may vary with the size of the local economy, we regress nonemployer establishment numbers on population and reservation indicator variables. The results suggest that shortfalls (relative to nearby county areas) in the number of reservation nonemployer establishments are especially wide for reservations with fewer than 15,000 residents, although these regressions explain very little of the overall variation among local areas. Similar regressions for nonemployer revenues indicate a qualitatively similar but weaker effect of population.

We also explore the extent to which the differences between reservation and nearby nonreservation areas are related to common, observable correlates of development. Adding indicators of income and education to our regressions diminishes the number of significant reservation-county differences, but these augmented regressions still explain very little of the overall variation. Further work, beyond the reduced-form equations presented here, would be needed to clarify the causal relationships underlying these multivariate correlation results.

The next section details the dataset creation and variable definitions. Section 3 provides empirical results and is followed by a brief summary of our findings.

2. Dataset Creation and Description

We primarily use the U.S. Census Bureau's Center for Economic Studies Integrated Longitudinal Business Database (ILBD), which is available to researchers as a restricted-use dataset. From 1975, the ILBD contains annual net revenue, industry classification data, and address information for most

nonemployer establishments, derived from IRS income tax returns filed by these businesses (Davis et al. 2007, Table 1).

We rely on SAS® procedures and geographic data files to conduct our own geocoding of the 2010 nonemployer establishment addresses in the ILBD. These are generally mailing addresses taken from tax returns (Davis et al. 2007, Table 1), and we have no option but to assume that nonemployers' place of work (physical address) is identical to their mailing address, even though this may contribute to geographic measurement error. After geocoding almost all relevant 2010 addresses, we assign nonemployer establishments to reservations based on their geographic coordinates and TIGER/Line Shapefiles® for reservation boundaries. Finally, we override a small percentage of these reservation codes in cases where the establishment's five-digit ZIP code is inconsistent with our SAS-based results.[4]

These methods do not precisely geocode the location of all establishments. As noted, some nonemployers may operate at a location different from the mailing address on their tax return. In other cases, spatial measurement error arises from an uninformative or hard-to-process address, such as an address with a post office box number instead of a street number. In most of these cases, longitudes and latitudes were based on the centroid of the establishment's ZIP code area.[5] As noted above, we overrode some of the centroid-based coordinates based on further analysis of ZIP code area and reservation overlaps. Nonetheless, we cannot eliminate nontrivial spatial measurement error in our assignment of establishments to reservations.

In this analysis we restrict our sample to federally recognized reservations in the contiguous 48 states and their nearby nonreservation areas. To operationalize our "comparison group" of nonreservation areas, we again follow AMT. We use geographic information systems (GIS) software to partition counties that intersect with reservations into their reservation and nonreservation components. We generate a new set of polygons that are identical to the county itself for all counties that do not intersect with any reservations and the nonreservation component of counties that intersect with at least one reservation. We label these polygons "county complements." We then restrict the set of county complements to those of counties included in at least one reservation's list of 10 nearest county neighbors, based on centroid-to-centroid distance.

We also limit our sample to reservations and county complements with a 2010 population of less than 50,000. Among reservations, this excludes only Navajo, whose exceptionally large area and population make it an extreme outlier for our purposes. Our final dataset with these restrictions contains spatially

[4] See AMT for details.

[5] For a very small fraction of records, SAS assigned longitude and latitude based on other address fields, such as Place (e.g., city).

aggregated data on 277 American Indian reservations and 514 county complements.[6] As shown in Table 1, the aggregates summarize information on about 685,000 nonemployer establishments across 17 industries, including about 39,000 on reservations.

3. Empirical Results

A goal of this paper is to compare, across 17 industries using the North American Industry Classification System (NAICS), the nonemployer segment of the economy on reservations and nearby county complement areas with respect to the per capita number of nonemployer establishments and the per capita revenue generated by these establishments. See AMT for a discussion of the many factors that might cause the per capita number of establishments or revenue to differ between reservations and county complements.

We begin by presenting summary statistics on reservations and nonparametric comparisons of reservations and nearby county complement areas. We then present, for the 17 industries in Table 1, a regression-based description of how the number of nonemployer establishments and the revenue they generate increase with population on reservations versus county complements.

A. Background Statistics on Population and Nonemployer Establishments

Our analysis focuses on whether there are reservation-versus-county differences in the number of nonemployer establishments or revenue per capita. In light of the potential for a nonlinear relationship between area population and firm numbers documented in Berry and Garrison (1958) and subsequent papers, we first show, in Figure 1, the population distributions for the reservation and county complement areas in our sample. Threshold effects—whereby establishment counts tend to zero below some minimal level of area population—may be especially relevant to American Indian reservations, which cluster at the low end of the population distribution in Figure 1, below 15,000. The nearby county complement areas are much more evenly distributed across the population bins, up to our sample cutoff point of 50,000. These facts help to explain our focus on population size as an important characteristic in the comparison of establishment counts and revenue generation on and off reservations. Specifically, over half of the on-reservation population lives in communities of fewer than 15,000 people, and this alone may be an

[6] We directly construct establishment and revenue totals for the county complements using our location-augmented ILBD dataset. We construct the remaining variables for county complements using Census ZIP code area estimates for 2010 and weights (from ArcGIS) showing the extent to which the land area of each ZIP code area overlaps the land area of any reservation that intersect the county.

important predictive characteristic for the presence of nonemployer establishments and the amount of revenue they generate.

Nonemployer Establishments Per Capita. Figure 2 shows that the composition of nonemployer establishments by industry is similar in reservations and county complements. The blue bars in Figure 2 indicate the percent of all reservation nonemployer establishments in each industry. The red bars provide the same measure for the county complements. Overall, it appears that there is little difference in the distribution of nonemployer establishments across industries for these two spatial categories. The largest differences, proportionally, are in Mining, Quarrying, and Oil and Gas Extraction (hereafter "Mining") and Educational Services, but these two sectors account for just a small share of the total number of all establishments.

Although the distribution of establishments across sectors is similar on reservations and in nearby county areas, the number of establishments per person is typically lower on reservations than in county complements, overall and in most sectors. Figure 3 shows this by plotting Table 1's reservation establishment parity ratios by industry. The numerator of this ratio (by industry and for all industries overall) is the percentage of all establishments in the sample that are located on reservations. The denominator is the same in each case and equals the percentage of the total population (of reservations plus county complements) that lives on reservations, or 8.2 percent. A ratio of 1 then indicates parity—the same number of nonemployer establishments per person on reservations as in county complements. Ratios below 1 indicate fewer nonemployer establishments per person on reservations, and the opposite for ratios above 1. The "Total" row of Table 1 shows an overall parity ratio of 0.70 (or 5.74/8.20), indicating about 30 percent fewer nonemployer establishments per person on reservations than in nearby county complement areas overall. The industry-specific parity ratios in Figure 3 show that reservations have a shortfall of nonemployer establishments per person in most industries. The two exceptions are again the Mining sector (parity ratio of 1.41) and the Education sector (parity ratio of 1.17).

Revenue Per Capita. Figure 4 shows that, unlike the composition of establishments, the composition of revenue by industry differs significantly between reservations and county complements in some large industries. Most notably, the Retail sector generates a much higher percentage of nonemployer revenues on reservations. Reservations also generate more revenue in Mining and Wholesale, two somewhat smaller sectors. Counties have a revenue edge in several other large sectors, including Agriculture, Forestry, Fishing, and Hunting; Construction; Transportation and Warehousing; Finance; and Other.

On net, overall revenue per capita on reservations is lower than in nearby county complements. The bottom row of Table 2 shows that the revenue parity index for total reservation revenue is 0.76, which means that the share of revenue on reservations is 24 percent less than the reservation share of total

population (reservation plus county complement) in our sample. Figure 5 shows the revenue parity index by industry, with results that parallel Figure 4. Reservations have a very distinct advantage (relative to county complements) in revenue per capita in the Retail sector and small advantages in Mining and Wholesale. However, reservations display distinctly lower (relative to county complements) revenue per capita in many of the remaining sectors, just as they showed for nonemployer establishments per capita in Figure 3.

It is important to note, however, that these results are averages across all the reservations and county complements in our sample and do not hold uniformly for each reservation. The revenue generated on a remote reservation with a limited flow of tourists could be very different from the situation on a reservation with a popular casino or other tourist amenties.

Comparison with the Distribution of Employer Establishments. Employer and nonemployer establishments, and the jobs they support, differ somewhat in their distribution across sectors, and this is true in similar ways in both reservations and nearby county areas, according to Figures 6 to 9. Figure 6 contrasts the distribution of employer and nonemployer reservation establishments across sectors, and Figure 7 provides the same comparison for the nearby county areas. In both places, nonemployer establishments are relatively concentrated—i.e. have a share at least few percentage points more than for employer establishments—in the sectors Finance and Insurance; Real Estate and Rental and Leasing; Professional, Scientific, and Technical Services; Management of Companies and Enterprises; Administrative and Support; Waste Management and Remediation Services; Educational Services; Arts, Entertainment, and Recreation; and Other Services (except Public Administration). The Construction sector is relatively concentrated in nonemployer establishments in the county areas but not on reservations. Sectors with a relatively low concentration of nonemployer establishments both on reservations and in counties include Agriculture, Forestry, Fishing and Hunting; Manufacturing, Wholesale Trade, Retail Trade, Accommodation and Food Services, and, by default (with none reported for nonemployers), Public Administration.

The relative sectoral distribution of nonemployers and employers shifts when we instead measure by jobs. For this comparison, we assume that each nonemployer establishment supports one job. This need not be strictly true; for example, an establishment without any hired employees might be owned and operated by a married couple or a set of partners and thereby create multiple "jobs" for these owners. It also means that for nonemployers the sector distribution of jobs is identical to the sectoral distribution of establishments discussed above. However, it is a simple and practical assumption that facilitates a comparison of how the distribution of employer and nonemployer jobs may differ between reservations and nearby county areas.

Five sectors collectively account for about half of all employer jobs in the county areas—Manufacturing; Retail Trade; Educational Services; Health Care and Social Assistance; and Health Care and Social Assistance. The Public Administration sector accounts for an additional 5 percent of employer jobs and has no nonemployer counterpart. These six sectors account for only about 25 percent of the nonemployer "jobs" in these county areas, and only in the Retail Trade sector are the employer and nonemployer shares roughly equal. By contrast, our count of nonemployer county "jobs" concentrates in Construction; Retail Trade; Finance and Insurance; Real Estate and Rental and Leasing; Professional, Scientific, and Technical Services; and Other Services.

As discussed in AMT, a slightly different mix of five nongovernment industries dominate employer jobs on reservations, with Arts, Entertainment, and Recreation (which includes casinos and casino-hotel complexes) replacing Manufacturing in the top five private sectors. The government, or Public Administration, sector is also more prominent in the employer job mix on reservations, accounting for about 14 percent of employer jobs there. Among reservation nonemployers, our count of jobs is concentrated in the same five nongovernment sectors that dominated county area nonemployer "jobs" (see previous paragraph) plus Health Care and Social Services.

Combined Employer and Nonemployer Distribution of Establishments and Jobs. In addition to comparing the distributions of employer and nonemployer outcomes, in Tables 3 and 4 and Figures 10 to 13 we combine them to give a broader picture of reservation of workplaces and jobs. We look at two outcomes: the number of establishments and the number of jobs. The combined establishment metric is straightforward—we add the number of employer and nonemployer establishments by sector and overall. To create the jobs metric, again assume the rough but practical assumption that each nonemployer establishment represents one job. The combined jobs metric is thus employer jobs plus nonemployer establishments.

With this approach, we again find that that distribution of establishments across sectors is similar between reservations and counties (Figure 10). This is not surprising, since we found this similarity for employer and nonemployer establishments separately. For employer-plus-nonemployer jobs, Figure 12 shows that the distribution across sectors is distinctly different between reservations and counties. Relative to county areas, the combined job measure on reservations is skewed toward Arts, Entertainment, and Recreation; Public Administration; and Accommodation and Food Services. By contrast, jobs in county areas are relatively common in sectors such as Agriculture, Forestry, Fishing, and Hunting; Construction; Manufacturing; Retail; Finance; and Health and Social Services. These differences generally follow those that AMT documented for the distribution of employer jobs, which is not surprising given that employer

jobs account for 83 percent of combined employer-plus-nonemployer jobs in our reservation-plus-county data.[7]

When we compare the per capita levels of employer-plus-nonemployer establishments and jobs on reservations to reservations' 8.2 percent share of the population in areas we study, we find a reservation parity index of 0.68 for combined establishments and 1.05 for combined jobs. (See Tables 3 and 4.) That is, the number of employer plus nonemployer establishments per capita on reservations is about 32 percent shy of parity with nearby county areas, but the number of reservation jobs per capita is slightly above parity with the county areas. The latter result is driven by jobs at employer establishments, mainly in casino-related and government sectors, as discussed in AMT. As listed in Table 3 and illustrated in Figure 11, for employer-plus-nonemployer establishments per capita we again find fewer on reservations than in counties in all but two sectors, Mining and Educational Services. For employer-plus-nonemployer jobs, Table 4 and Figure 13 show fewer per capita on reservations in most sectors but also several sectors where reservations have the edge over counties, including large advantages in sectors where AMT found much higher levels of reservation employer jobs per capita—Arts, Entertainment, and Recreation; Public Administration; and Accommodation and Food Services.

B. Descriptive Regression Analysis of Establishments and Revenue per capita

The nonparametric results above show a sizable deficit of nonemployer establishments and revenue on reservations but do not say whether the raw differences are statistically significant and how they vary across reservations. To address some of these questions, we follow AMT by fitting descriptive regressions that relate both nonemployer establishments per capita and revenue per capita to population size and reservation location, to capture how the relative position of reservations and county areas may vary with population size. Specifically, we use weighted least squares, with population as the weight to fit a descriptive regression equation with the following form:

Equation 1:

$$\left(\frac{E}{P}\right)_i = \alpha + \beta_1 Population_i + \beta_2 Population_i^2 + \beta_3 Reservation_i + \beta_4 (Reservation_i \times Population_i) + \beta_5 \left(Reservation_i \times Population_i^2\right) + \varepsilon_i$$

[7] By contrast, employer establishments account for only 29 percent of combined employer-plus-nonemployer establishment in our reservation-plus-county data.

The outcome variable $(E/P)_i$ is either establishments or revenue per capita for the i^{th} area (a reservation or a county complement) in 2010. We conduct this analysis separately for each of our 17 two-digit NAICS categories. There is a common intercept term included in the model. The variable Reservation equals 1 if the observation is on an American Indian reservation and is 0 if it is in a county complement. To allow for a nonlinear relationship between P and E, we include a simple count of population for the geographic unit as well as its squared term in the regression, and we interact the reservation indicator variable with these two population measures.[8] This full set of interaction terms allows counties and reservations to have fully independent E-P relationships. The random variable ε_i represents the error term. Our baseline descriptive regression includes only this parsimonious selection of variables. However, we also estimate augmented specifications that include additional variables to control for factors such as rural location, population density, income, poverty, and educational attainment for the geographic unit.

As in AMT, our analysis here is not intended to identify causal relationships in any sense. Our descriptive and augmented regression results will be interpreted as conditional partial correlations between the right-hand side variables and the outcome variables above. In this framework, a reservation deficit can be interpreted as a residual deficit after holding constant typical correlates of development, and it is likely to represent a conservative estimate of the impact of factors that are uniquely present on reservations (since many of the additional control variables are likely endogenous). Nevertheless, this is the first time that it has been possible to identify the industry, count, and size of nonemployer establishments by reservation status.

The full set of estimated regression coefficients and related analyses, sector by sector, of how establishment numbers or revenue vary with population on reservations as compared to nearby county complement areas appears in a separate supplement (Akee et al. 2018). In this paper, we show selected results that illustrate the key patterns found. One important pattern—a tendency in many industries for the number of both establishments and revenue per capita to be lower on reservations than in county complements for population levels below about 15,000—is illustrated in Figures 14 and 15, for the sector Agriculture, Forestry, Fishing, and Hunting. These figures are based on the corresponding fitted regression coefficients and variance-covariance matrices shown in Tables 5 and 6. In both Figure 14 and Figure 15, the solid lines at the center of the shaded areas are lines of best fit for Equation 1, computed as shown in Equation 2, where E = the number of either establishments or revenue; a = the fitted value of α, B_i = the fitted value of β_i, for i = 1, 2, 3, 4, and 5; P =population, and R = the dummy variable for location on a reservation. Setting R = 0 yields the line of best fit for county complements (thinner line), and R = 1 yields the corresponding best-fit line for reservations (thicker line).

[8] Berry and Garrison (1958) provide an early discussion of the nonlinearity of this relationship at the local level in the U.S.

Equation 2:

$$(E) = aP + B_1P^2 + B_2P^3 + B_3(RP) + B_4(RP^2) + B_5(RP^3)$$

Each line is surrounded by a shaded area, red for county complements and blue for reservations. These shaded areas represent a 90 percent confidence region around the line of best fit. To calculate these regions, we randomly drew 1,000 sets of coefficients from a multivariate normal distribution with the fitted coefficients as the mean and their estimated variance-covariance matrix as the variance matrix. Then we used Equation 2 to calculate E as a function of P and R for each draw. The shaded region shows, for each level of P, the middle 90 percent of the resulting distribution of the fitted values for both county complements (R = 0) and reservations (R = 1). That is, for each value of population P, 5 percent of the fitted values of E were above the shaded region and 5 percent were below, for both county complements and reservations (separately).

In Figure 14, the 90 percent confidence interval for reservations noticeably widens as population increases, in part because the number of areas becomes very small at the high end of the population range. Specifically, in our sample only the 11 reservations shown in Table 7 have populations over 15,000. Because the county complements in our sample are more numerous and their population sizes are more evenly distributed, the 95 percent confidence interval for those estimates are more precisely estimated and widen less as population increases, for most industries.

Figures 14 and 15 show that the fitted numbers of Agriculture, Forestry, Fishing, and Hunting nonemployer establishments and revenue tend to be significantly lower on reservations relative to county complements for population levels up to about 15,000. Beyond 15,000, the confidence intervals are wide (especially for reservations) and often overlap.

This pattern—lower estimated levels of both nonemployer establishments and nonemployer revenue per capita on reservations over a range of lower population values—prevails in a slight majority of industries, as we show in graphs similar to Figures 14 and 15 but for all 17 sectors in Akee et al. (2018). For nonemployer establishments, the deficits at low population levels are statistically significant in a majority of the 17 sectors, whereas for revenue this is true in fewer sectors and over a more limited range of low populations (only six sectors up to 10,000 residents or seven sectors up to 5,000 residents). However, the reverse—a reservation level that is statistically significantly higher at any population level—is rare, holding in only two cases for nonemployer establishments per capita (for Mining at populations of 25,000 to 50,000 and Educational Services establishments at populations from 7,500 to 35,000) and in one case for revenue per capita (Educational Services at populations from 17,500 to 22,500).

Beyond 15,000 for per capita establishments and at all population levels for per capita revenue, there is often an overlap of the confidence intervals for the two geography types, and to a greater extent than in AMT's findings for employer establishments. This partly reflects the poorer fit of Equation 1 for nonemployer establishments than for employer establishments, as shown by the low R-squared of 0.09 in Table 5 (as compared with the corresponding value for employer establishments of 0.28 in AMT's Table 3).

A summary of these findings for nonemployer establishments in all 17 sectors appears in Tables 8 and 9. Industry categories are presented along the Y-axis and range from Agriculture, Forestry, Fishing, and Hunting (NAICS 11) to Other Services (NAICS 81). (See Table 1 for a full set of sector names and NAICS codes.) Population size is given along the X-axis (in thousands). Each sector-population cell in the table reports its respective gap—the fitted number of county complement establishments minus the fitted number of reservation establishments in Table 8 and similarly for gaps in fitted revenue in Table 9. For each industry, orange-colored cells show population cells where the outcome for reservations is significantly lower, based on 90 percent confidence regions computed with our randomly drawn coefficients. The light yellow color indicates a reservation deficit that is not significant. The gray color marks cells where reservations have an advantage that is not significant, and the blue color shows cells where reservations have significantly higher outcomes, as compared to county complements. Table 8 shows the patterns of statistically significant nonemployer establishment deficits on reservations with populations below 15,000. Table 9 shows the aforementioned statistically significant revenue deficits on reservations in six or seven industries when population is low. At higher population sizes, Tables 8 and 9 show mostly insignificant differences, albeit with a preponderance of reservation deficits.

C. Regression Analysis with Additional Control Variables

Although we do not attempt a causal analysis of the reservation-county gaps, we did examine the extent to which additional control variables commonly used in the spatial density literature affect the basic descriptive patterns discussed above. We added two economic geography variables—rural location and population density[9]—that tend to change gradually with distance and are thus likely to affect reservations and their neighboring county areas somewhat evenly. We also added three measures of personal

[9] For county complements, rural location is an indicator variable equal to 1 if the U.S. Department of Agriculture's 2013 Rural-Urban Continuum Code is greater than 3 and 0 otherwise. Reservations are assigned the same value as their nearest county (based on centroid-to-centroid distance). Population density is measured as square miles per person, based on 2010 *Census Gazetteer* data on population and the land area of county complements and reservations.

outcomes[10]—per capita personal income, the poverty rate, and the percentage of adults (25 years old and older) with a bachelor's degree—whose values can vary significantly over short distances, depending on the nature of the local economy. Thus, the causality links between this second group of variables and either establishment numbers or revenue can easily flow in either or both directions. By contrast, we might expect that establishment numbers and revenue are less likely to strongly affect the two economic geography variables (rural location and population density), although such effects are clearly possible.

Tables 10 and 11, in the same format as Tables 8 and 9, summarize results with these added control variables. For establishments per capita, a majority of industries still exhibit a significant shortfall on reservations, at least when the local population is at or below 7,500, but now the opposite holds for the Arts, Entertainment, and Recreation sector. Above 7,500 residents, reservation deficits predominate but most differences are not statistically significant.

Only 5 sectors (Agriculture, Forestry, Fishing, and Hunting; Construction; Transportation and Warehousing; Accommodation and Food Services; and Other Services) exhibit a significant reservation deficit in revenue per capita for populations at or below 7,500, and each of these also had significantly fewer nonemployer establishments per capita at low population levels. Insignificant differences generally prevail in Table 11 as well as Table 10. This may reflect the poor fit of our augmented regression equation, manifested in low R-square values and wide confidence bands especially around the estimates of per capita outcomes on reservations. Both population and our additional control variables appear to be less correlated with outcomes for nonemployer establishments than was true in AMT's regressions for employer establishments.

Summary

Using a newly linked confidential-use dataset (U.S. Census Integrated Longitudinal Business Database), we are the first to identify nonemployer establishments located on American Indian reservations and make useful comparisons to comparable establishments in nearby county areas. Our analysis focuses on the number of nonemployer establishments and revenue per capita across 17 industry categories. We find that there tend to be large deficits in the per capita number of nonemployer establishments located on reservations relative to county complements overall and for most industries

[10] The data are from the 2008–2012 American Community Survey. For counties that overlap one or more reservations in our sample, we compute the value of these variables using land area weights and ACS data on Zip Code Tabulation Areas (ZCTAs). That is, we adjust the raw ACS value for a ZCTA by multiplying it by the fraction of the ZCTA's land area that lies inside the county but outside of all reservation boundaries. County complement values are constructed by aggregating over their ZCTAs. (We separately aggregate the numerator and denominator of our ratio variables and then divide.)

when area populations are below 15,000. Reservation nonemployers also generate less revenue per person than their counterparts in nearby counties overall, but even in our simplest regressions we find this difference to be statistically significant in only a minority of sectors and mainly at population levels below 7,500. Adding additional control variables does not have a large effect on these results. Further work is needed to understand the causal relationships underlying the reservation-county difference we document.

References

Akee, Randall, Elton Mykerezi, and Richard M. Todd. 2017. "Reservation Employer Establishments: Data from the U.S. Census Longitudinal Business Database." Federal Reserve Bank of Minneapolis, Center for Indian Country Development Working Paper Number 2017-02.

Akee, Randall, Elton Mykerezi, and Richard M. Todd. 2018. "Supplement to Reservation Nonemployer Establishments." Federal Reserve Bank of Minneapolis, Center for Indian Country Development Working Paper Number 2018-02.

Berry, Brian J. L. and William L. Garrison. 1958. "A Note on Central Place Theory and the Range of a Good." *Economic Geography*, Volume 34, pp. 304–311.

Davis, Steven J., John Haltiwanger, Ron S. Jarmin, C. J. Krizan, Javier Miranda, Alfred Nucci, and Kristin Sandusky. 2007. "Measuring the Dynamics of Young and Small Businesses Integrating the Employer and Nonemployer Universes." National Bureau of Economic Research Working Paper 13226 (July).

Table 1: Nonemployer Establishment Overview by Industry

Industry	NAICS Codes	Nonemployer Establishments	Percent on Reservations	Percent Rural	Implied # of Reservation Establishments	Reservation Establishment Parity Index*
Agriculture, Forestry, Fishing and Hunting	11	40,000	4.42%	87.49%	1768	0.54
Mining, Quarrying, and Oil and Gas Extraction	21	4,600	11.56%	90.35%	532	1.41
Utilities	22	900	5.26%	85.10%	47	0.64
Construction	23	92,000	4.75%	84.81%	4370	0.58
Manufacturing	31, 32, 33	16,000	5.40%	84.89%	864	0.66
Wholesale Trade	42	11,000	7.62%	83.42%	838	0.93
Retail Trade	44, 45	76,000	5.13%	83.22%	3899	0.63
Transportation and Warehousing	48, 49	33,000	4.84%	83.38%	1597	0.59
Information	51	6,300	6.22%	82.07%	392	0.76
Finance and Insurance; Real Estate and Rental and Leasing	52, 53	74,000	5.13%	83.46%	3796	0.63
Professional, Scientific, and Technical Services	54	66,000	6.54%	82.48%	4316	0.80
Management of Companies and Enterprises; Administrative and Support; and Waste Management and Remediation Services	55, 56	51,000	6.21%	83.22%	3167	0.76
Educational Services	61	15,000	9.63%	82.79%	1445	1.17
Health Care and Social Assistance	62	54,000	7.35%	83.23%	3969	0.90
Arts, Entertainment, and Recreation	71	31,000	7.21%	83.00%	2235	0.88
Accommodation and Food Services	72	14,000	6.62%	87.30%	927	0.81
Other Services (except Public Administration)	81	100,000	5.16%	83.98%	5160	0.63
Total		684,800	5.74%	83.90%	39322	0.70

Note: Figures are approximate, in keeping with Census Bureau disclosure rules.
* Index = Percent on Reservations/8.2, where 8.2 is the percentage of the population (reservations plus county complements) on reservations.

Table 2: Nonemployer Revenue Overview by Industry

Industry	NAICS Codes	Revenue ($1,000)	Percent on Reservations	Implied Reservation Revenue ($1,000)	Reservation Revenue Parity Index*
Agriculture, Forestry, Fishing and Hunting	11	$2,750,000	3.85%	$105,875	0.47
Mining, Quarrying, and Oil and Gas Extraction	21	$1,761,000	8.98%	$158,138	1.10
Utilities	22	$79,910	2.61%	$2,086	0.32
Construction	23	$5,440,000	5.29%	$287,776	0.65
Manufacturing	31, 32, 33	$2,049,000	3.68%	$75,403	0.45
Wholesale Trade	42	$1,696,000	8.77%	$148,739	1.07
Retail Trade	44, 45	$4,716,000	11.90%	$561,204	1.45
Transportation and Warehousing	48, 49	$3,505,000	4.48%	$157,024	0.55
Information	51	$215,900	3.30%	$7,125	0.40
Finance and Insurance; Real Estate and Rental and Leasing	52, 53	$5,774,000	5.27%	$304,290	0.64
Professional, Scientific, and Technical Services	54	$2,502,000	6.15%	$153,873	0.75
Management of Companies and Enterprises; Administrative and Support; and Waste Management and Remediation Services	55, 56	$1,179,000	5.87%	$69,207	0.72
Educational Services	61	$140,100	7.57%	$10,606	0.92
Health Care and Social Assistance	62	$1,681,000	5.82%	$97,834	0.71
Arts, Entertainment, and Recreation	71	$639,600	5.31%	$33,963	0.65
Accommodation and Food Services	72	$1,142,000	6.51%	$74,344	0.79
Other Services (except Public Administration)	81	$2,705,000	4.59%	$124,160	0.56
Total		$37,975,510	6.25%	$2,371,646	0.76

Note: Figures are approximate, in keeping with Census Bureau disclosure rules.
* Index = Percent on Reservations/8.2, where 8.2 is the percentage of the sample population (reservations plus county complements) living on reservations.

Table 3: Combined Employer-plus-Nonemployer Establishment Overview by Industry

Industry	NAICS Codes	Implied # of Reservation Nonemp. Estbs.	Implied # of Reservation Emp. Estbs.	Implied Total # of Reservation Estbs.	Percent of Emp+Nonemp. Estbs. on Reservations	Reservation Emp.+Nonemp. Estb. Parity Index
Agriculture, Forestry, Fishing and Hunting	11	1768	1363	3131	4.54%	0.55
Mining, Quarrying, and Oil and Gas Extraction	21	532	264	796	11.37%	1.39
Utilities	22	47	101	149	4.79%	0.58
Construction	23	4370	1581	5951	4.84%	0.59
Manufacturing	31, 32, 33	864	552	1416	5.06%	0.62
Wholesale Trade	42	838	590	1428	6.80%	0.83
Retail Trade	44, 45	3899	2040	5939	5.12%	0.62
Transportation and Warehousing	48, 49	1597	638	2235	5.08%	0.62
Information	51	392	224	615	5.81%	0.71
Finance and Insurance; Real Estate and Rental and Leasing	52, 53	3796	1104	4900	5.05%	0.62
Professional, Scientific, and Technical Services	54	4316	867	5183	6.25%	0.76
Management of Companies and Enterprises; Administrative and Support; and Waste Management and Remediation Services	55, 56	3167	560	3727	6.11%	0.75
Educational Services	61	1445	299	1744	9.48%	1.16
Health Care and Social Assistance	62	3969	1296	5265	6.75%	0.82
Arts, Entertainment, and Recreation	71	2235	292	2527	6.94%	0.85
Accommodation and Food Services	72	927	1250	2177	5.58%	0.68
Other Services (except Public Administration)	81	5160	1222	6382	5.07%	0.62
Public Administration	92		358	358	6.40%	0.78
Total		39322	14601	53923	5.58%	0.68

Note: Figures are approximate, in keeping with Census Bureau disclosure rules.
* Index = Percent on Reservations/8.2, where 8.2 is the percentage of the population (reservations plus county complements) on reservations.

Table 4: Combined Employer-plus-Nonemployer Jobs Overview by Industry

Industry	NAICS Codes	Implied # of Reservation Nonemp. Jobs	Implied # of Reservation Emp. Jobs	Implied Total # of Reservation Jobs	Percent of Emp+Nonemp. Jobs on Reservations	Reservation Emp.+Nonemp. Jobs Parity Index
Agriculture, Forestry, Fishing and Hunting	11	1768	6734	8502	4.78%	0.58
Mining, Quarrying, and Oil and Gas Extraction	21	532	2840	3372	5.75%	0.70
Utilities	22	47	1296	1343	4.21%	0.51
Construction	23	4370	10296	14666	6.21%	0.76
Manufacturing	31, 32, 33	864	14426	15290	3.75%	0.46
Wholesale Trade	42	838	6940	7778	7.01%	0.85
Retail Trade	44, 45	3899	27082	30980	6.30%	0.77
Transportation and Warehousing	48, 49	1597	5971	7568	6.05%	0.74
Information	51	392	3662	4054	8.39%	1.02
Finance and Insurance; Real Estate and Rental and Leasing	52, 53	3796	9446	13243	6.56%	0.80
Professional, Scientific, and Technical Services	54	4316	5652	9968	6.39%	0.78
Management of Companies and Enterprises; Administrative and Support; and Waste Management and Remediation Services	55, 56	3167	12132	15299	9.56%	1.17
Educational Services	61	1445	27519	28963	8.14%	0.99
Health Care and Social Assistance	62	3969	29245	33214	6.44%	0.78
Arts, Entertainment, and Recreation	71	2235	33978	36213	31.49%	3.84
Accommodation and Food Services	72	927	45394	46321	13.20%	1.61
Other Services (except Public Administration)	81	5160	16625	21785	9.35%	1.14
Public Administration	92		42395	42395	21.63%	2.64
Total		39322	301632	340954	8.58%	1.05

Note: Figures are approximate, in keeping with Census Bureau disclosure rules.
* Index = Percent on Reservations/8.2, where 8.2 is the percentage of the population (reservations plus county complements) on reservations.

Table 5: Weighted Least-Squares Regression Results for Number of Establishments

Agriculture, Forestry, Fishing, and Hunting

Variable:	Intercept	P (1000s)	P*P	R	R*P	R*P*P
Fitted Coefficients:	7.531E-003	-1.998E-007	2.275E-012	-5.834E-003	2.841E-007	-4.302E-012
Std. Error:	5.87E-004	4.762E-008	8.54E-013	1.123E-003	1.22E-007	2.464E-012
T Statistic:	12.8300	-4.19500	2.66300	-5.19700	2.32900	-1.74600
VCV	Intercept	P (1000s)	P*P	R	R*P	R*P*P
Intercept	3.446E-007	-2.578E-011	4.165E-016	-3.446E-007	2.578E-011	-4.165E-016
P (1000s)	-2.578E-011	2.268E-015	-3.967E-020	2.578E-011	-2.268E-015	3.967E-020
P*P	4.165E-016	-3.967E-020	7.294E-025	-4.165E-016	3.967E-020	-7.294E-025
R	-3.446E-007	2.578E-011	-4.165E-016	1.260E-006	-1.137E-010	1.953E-015
R*P	2.578E-011	-2.268E-015	3.967E-020	-1.137E-010	1.487E-014	-2.886E-019
R*P*P	-4.165E-016	3.967E-020	6.000E+000	1.953E-015	-2.886E-019	6.072E-024
R-Squared: 0.08981						

Table 6: Weighted Least-Squares Regression Results for Revenue*

Agriculture, Forestry, Fishing, and Hunting

Variable:	Intercept	P (1000s)	P*P	R	R*P	R*P*P
Fitted Coefficients:	5.458E-001	-1.394E-005	1.357E-010	-4.534E-001	2.037E-005	-2.856E-010
Std. Error:	8.231E-002	6.677E-006	1.197E-010	1.574E-001	1.710E-005	3.455E-010
T Statistic:	6.632E+000	-2.087E+000	1.133E+000	-2.880E+000	1.191E+000	-8.265E-001
VCV	Intercept	P (1000s)	P*P	R	R*P	R*P*P
Intercept	6.774E-003	-5.068E-007	8.189E-012	-6.774E-003	5.068E-007	-8.189E-012
P (1000s)	-5.068E-007	4.459E-011	-7.799E-016	5.068E-007	-4.459E-011	7.799E-016
P*P	8.189E-012	-7.799E-016	1.434E-020	-8.189E-012	7.799E-016	-1.434E-020
R	-6.774E-003	5.068E-007	-8.189E-012	2.478E-002	-2.236E-006	3.840E-011
R*P	5.068E-007	-4.459E-011	7.799E-016	-2.236E-006	2.924E-010	-5.675E-015
R*P*P	-8.189E-012	7.799E-016	-1.434E-020	3.840E-011	-5.675E-015	1.194E-019
R-Squared: 0.03302	*Revenue expressed as ###					

Note: P = population; R = 1 for reservations and 0 for county complements.

Table 7: Reservations with 2010 Population between 15,000 and 50,000

Reservation	Population 2010
Nez Perce Reservation	18,437
Pine Ridge Reservation	18,834
Oneida (WI) Reservation	22,775
Uintah and Ouray Reservation	24,369
Agua Caliente Indian Reservation	24,545
Isabella Reservation	26,274
Wind River Reservation	26,481
Flathead Reservation	28,359
Yakama Nation Reservation	31,219
Puyallup Reservation	46,813
Osage Reservation	47,472

Table 8: Establishment Count Gap—County Minus Reservation (Based on Fitted Coefficients of a Six-Variable Weighted Least-Squares Regression)

SECTOR																						
11	3	6	13	23	30	34	37	38	38	37	36	36	35	35	37	41	46	54	65	79	97	119
21	0	1	2	3	4	4	3	1	-1	-4	-8	-13	-18	-24	-31	-39	-48	-57	-68	-79	-91	-104
22	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	2	2
23	3	7	16	29	40	49	56	62	66	69	71	73	74	75	75	76	78	80	83	87	92	100
31_32_33	0	1	2	3	4	5	6	6	6	7	7	8	8	9	10	12	14	17	20	24	29	34
42	0	0	1	1	1	0	-1	-3	-4	-6	-7	-7	-8	-7	-6	-4	0	4	10	18	27	38
44_45	4	7	16	27	35	39	40	39	37	34	30	27	25	25	27	32	40	53	70	93	122	158
48_49	2	4	10	17	21	24	25	25	23	21	18	14	11	8	6	4	3	4	7	11	18	27
51	0	0	1	1	1	1	1	0	0	-1	-1	-2	-2	-2	-2	-1	0	1	3	6	9	13
52_53	4	8	17	28	33	34	30	24	16	7	-4	-13	-22	-29	-33	-33	-29	-20	-5	17	47	85
54	2	4	8	13	14	13	10	6	0	-6	-12	-18	-22	-26	-27	-27	-23	-16	-6	9	29	54
55_56	1	2	5	10	13	16	17	18	19	19	18	18	17	15	14	13	12	11	10	10	10	11
61	0	0	0	-1	-2	-5	-7	-10	-12	-15	-17	-19	-20	-20	-19	-17	-13	-8	-1	7	18	31
62	1	2	4	5	6	5	3	0	-3	-5	-8	-9	-9	-8	-6	-1	7	17	30	46	67	91
71	0	1	1	2	2	1	0	-1	-2	-3	-3	-4	-3	-1	1	5	10	17	25	35	48	62
72	1	1	3	5	7	7	7	6	5	4	3	2	1	0	1	1	3	5	9	14	20	28
81	5	9	21	37	48	54	57	57	55	51	46	41	37	33	31	31	34	41	51	67	88	116
Pop. (1000s)	0.5	1.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0

Table 9: Aggregate Revenue -Gap—County Minus Reservation (Based on Fitted Coefficients of a Six-Variable Weighted Least-Squares Regression)

SECTOR																						
11	222	433	1011	1793	2375	2783	3043	3182	3227	3205	3142	3066	3003	2980	3024	3161	3418	3822	4400	5179	6185	7445
21	55	100	173	111	-142	-544	-1051	-1621	-2210	-2775	-3273	-3662	-3898	-3939	-3740	-3260	-2455	-1282	301	2339	4873	7948
22	7	14	33	61	85	103	118	128	135	138	138	136	130	123	114	103	90	77	63	48	34	19
23	195	382	898	1607	2134	2490	2681	2717	2607	2358	1979	1479	866	148	-665	-1565	-2544	-3594	-4705	-5870	-7079	-8325
31_32_33	135	270	671	1318	1922	2463	2922	3279	3515	3611	3547	3304	2862	2202	1305	151	-1280	-3005	-5046	-7421	-10150	-13252
42	-134	-254	-533	-752	-699	-414	59	678	1402	2190	2998	3785	4509	5128	5600	5884	5937	5717	5182	4292	3002	1273
44_45	-315	-605	-1325	-2069	-2313	-2140	-1632	-871	60	1080	2105	3055	3846	4397	4626	4449	3786	2553	669	-1949	-5383	-9715
48_49	277	545	1288	2338	3160	3767	4171	4384	4417	4282	3993	3559	2994	2309	1516	628	-344	-1389	-2493	-3646	-4835	-6048
51	10	19	43	75	97	112	122	128	133	140	149	164	186	217	260	317	389	479	589	721	877	1059
52_53	187.6	366.9	855.0	1506.8	1963.7	2233.7	2324.9	2245.4	2003.5	1607.2	1064.6	383.9	-426.8	-1359.5	-2405.8	-3557.9	-4807.4	-6146.4	-7566.6	-9060.0	-10618.4	-12233.8
54	172.8	332.0	731.3	1155.3	1311.9	1240.7	981.7	574.6	59.3	-524.4	-1136.7	-1737.8	-2287.9	-2747.1	-3075.7	-3233.7	-3181.5	-2879.2	-2287.0	-1365.0	-73.4	1627.5
55_56	22.9	43.9	95.6	148.4	166.3	157.6	130.3	92.5	52.3	17.8	-3	-2	30	99	215	384	617	920	1301	1769	2332	2998
61	2	3	5	3	-6	-20	-37	-55	-74	-91	-105	-114	-117	-113	-99	-75	-38	12	79	162	263	385
62	41	79	173	267	296	271	206	114	7	-101	-198	-272	-308	-295	-219	-68	171	511	965	1546	2266	3139
71	43	83	186	306	372	391	373	327	263	190	117	54	10	-6	15	83	207	396	660	1008	1449	1992
72	52	100	214	319	333	273	156	0	-177	-360	-529	-669	-761	-788	-734	-580	-309	95	651	1376	2286	3400
81	5	9	21	37	48	54	57	57	55	51	46	41	37	33	31	31	34	41	51	67	88	116
Pop. (1000s)	0.5	1.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0

Legend for both tables:

- Reservation significantly lower
- Reservation lower, not significant
- County lower, not significant
- County significantly lower

Table 10: Nonemployer Establishments Gap—County Minus Reservation (Based on Fitted Coefficients of an Eleven-Variable Weighted Least-Squares Regression)

SECTOR																						
11	1	3	7	12	15	18	20	20	20	20	19	18	17	16	15	15	15	16	18	21	25	31
21	0	0	0	0	0	0	-1	-2	-4	-7	-10	-15	-20	-26	-34	-43	-53	-64	-78	-92	-109	-127
22	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
23	2	4	8	16	22	28	32	35	38	39	40	40	39	37	35	32	28	24	19	14	8	2
31_32_33	0	0	-1	-1	-2	-2	-3	-4	-4	-4	-5	-5	-5	-5	-4	-3	-2	-1	0	2	5	8
42	0	1	1	2	2	1	0	-1	-2	-3	-4	-5	-5	-5	-3	-1	2	6	11	18	26	36
44_45	1	3	6	8	7	4	-1	-7	-14	-21	-28	-33	-37	-39	-38	-34	-26	-13	4	27	56	91
48_49	2	3	8	13	15	16	15	12	8	3	-2	-7	-12	-16	-20	-22	-23	-21	-18	-12	-3	9
51	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	3	4	5	7	8	10	13
52_53	1	2	6	9	11	12	12	10	9	6	4	2	0	-2	-2	-2	0	4	9	16	26	38
54	0	0	1	2	4	6	9	12	15	19	22	25	29	32	35	38	40	42	43	44	44	43
55_56	2	3	8	15	20	25	29	33	35	37	38	38	38	37	36	34	31	28	24	21	16	12
61	0	0	0	0	-1	-2	-3	-4	-5	-5	-6	-6	-6	-5	-4	-2	1	4	9	15	22	30
62	1	2	4	6	8	8	8	8	8	7	7	7	8	10	13	17	23	30	39	51	64	81
71	-1	-2	-4	-7	-8	-9	-8	-7	-5	-2	2	5	9	14	18	22	26	30	34	37	39	41
72	1	1	3	5	6	7	8	9	9	9	9	9	8	8	7	7	6	6	6	6	6	7
81	4	7	16	28	36	41	43	42	39	35	29	23	18	12	8	6	5	7	12	20	32	49
Pop. (1000s)	0.5	1.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0

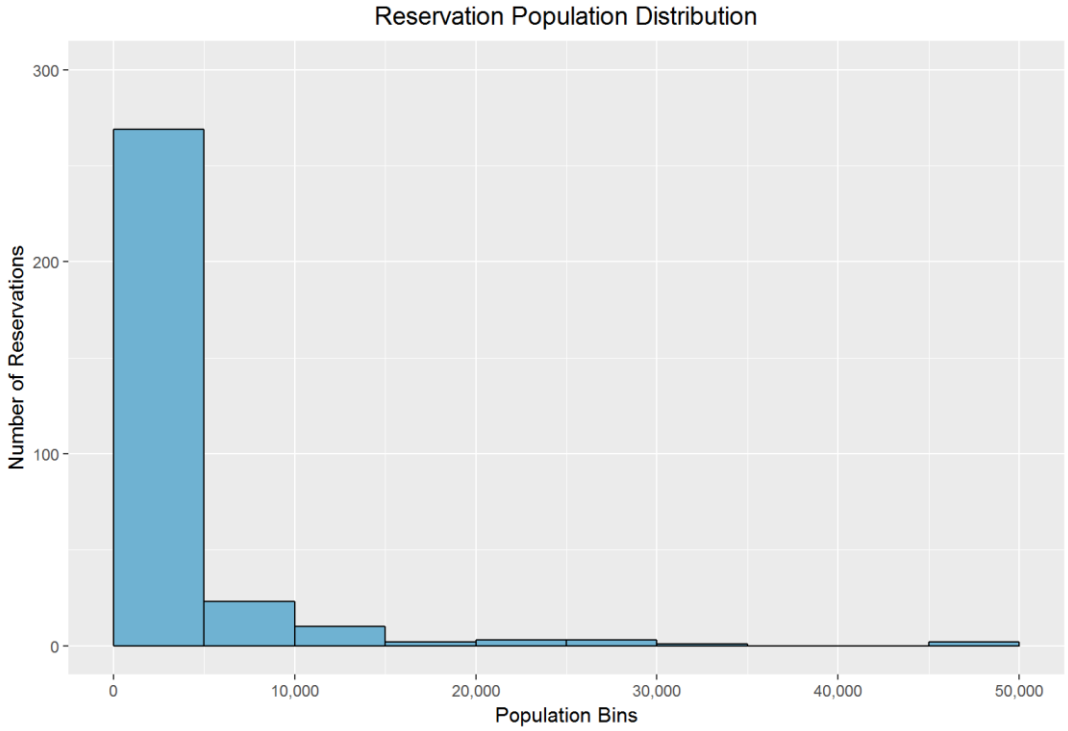
Table 11: Revenue Gap—County Minus Reservation (Based on Fitted Coefficients of an Eleven-Variable Weighted Least-Squares Regression)

SECTOR																						
11	167	323	738	1256	1577	1729	1735	1621	1413	1135	813	473	138	-164	-409	-572	-627	-550	-314	105	733	1595
21	-200	-382	-830	-1271	-1373	-1189	-769	-165	572	1392	2242	3072	3831	4467	4929	5166	5127	4760	4015	2840	1183	-1005
22	9	17	41	76	104	127	144	157	164	166	163	157	146	131	113	91	66	38	7	-26	-62	-100
23	121	243	618	1256	1894	2507	3074	3573	3981	4276	4435	4437	4259	3878	3273	2421	1299	-114	-1840	-3904	-6325	-9128
31_32_33	138	271	631	1112	1448	1642	1701	1629	1429	1108	669	117	-543	-1307	-2169	-3126	-4173	-5305	-6517	-7804	-9163	-10589
42	-215	-415	-926	-1506	-1785	-1808	-1620	-1267	-794	-245	334	897	1400	1797	2044	2094	1903	1426	617	-569	-2177	-4253
44_45	-353	-681	-1522	-2481	-2954	-3019	-2754	-2236	-1543	-752	58	810	1427	1831	1944	1688	986	-239	-2066	-4572	-7835	-11933
48_49	216	424	1001	1809	2433	2881	3161	3283	3254	3083	2779	2350	1804	1150	398	-446	-1373	-2373	-3439	-4561	-5733	-6944
51	-2	-3	-5	-3	6	21	42	68	99	134	174	217	263	312	363	417	471	527	584	640	697	753
52_53	-42	-67	-40	302	949	1824	2851	3954	5055	6078	6947	7585	7916	7862	7348	6296	4631	2275	-847	-4814	-9700	-15583
54	128	249	573	990	1269	1429	1488	1463	1374	1237	1071	895	726	582	481	443	484	622	877	1266	1807	2518
55_56	27	52	122	217	292	352	400	443	485	531	587	657	746	860	1003	1180	1397	1658	1968	2333	2758	3247
61	1	2	5	8	12	16	21	28	36	46	59	76	97	121	151	186	227	274	328	389	458	535
62	23	45	104	179	230	262	281	290	295	302	314	337	376	436	522	639	791	984	1222	1512	1856	2262
71	28	56	143	291	444	600	755	908	1058	1201	1336	1462	1575	1674	1756	1821	1865	1887	1884	1855	1797	1709
72	34	65	147	247	304	327	321	293	248	193	135	80	34	3	-6	13	67	161	303	497	752	1072
81	109	212	494	871	1145	1328	1434	1476	1466	1418	1344	1257	1171	1097	1051	1043	1087	1197	1384	1663	2046	2545
Pop. (1000s)	0.5	1.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0

Legend for both tables:

- Reservation significantly lower
- Reservation lower, not significant
- County lower, not significant
- County significantly lower

Figure 1: The Population Distribution of Reservations and County Complements



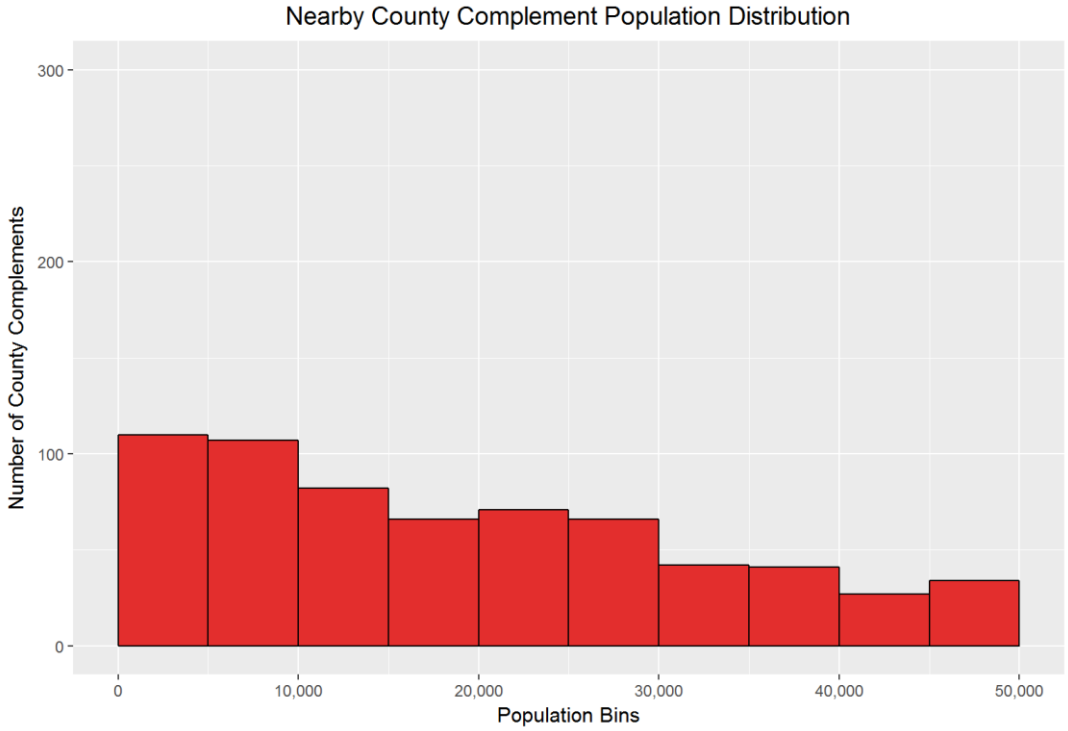


Figure 2: Nonemployer Establishment Shares by Sector and Place

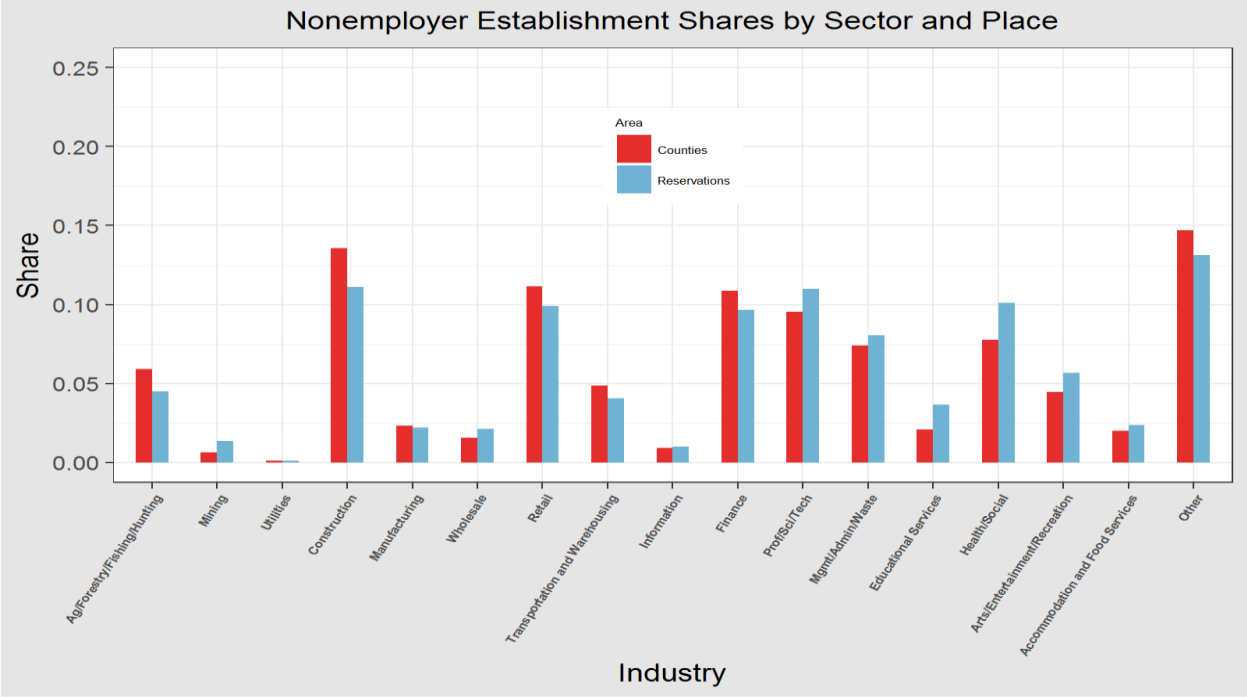


Figure 3: Index of Reservation Parity: Nonemployer Establishments

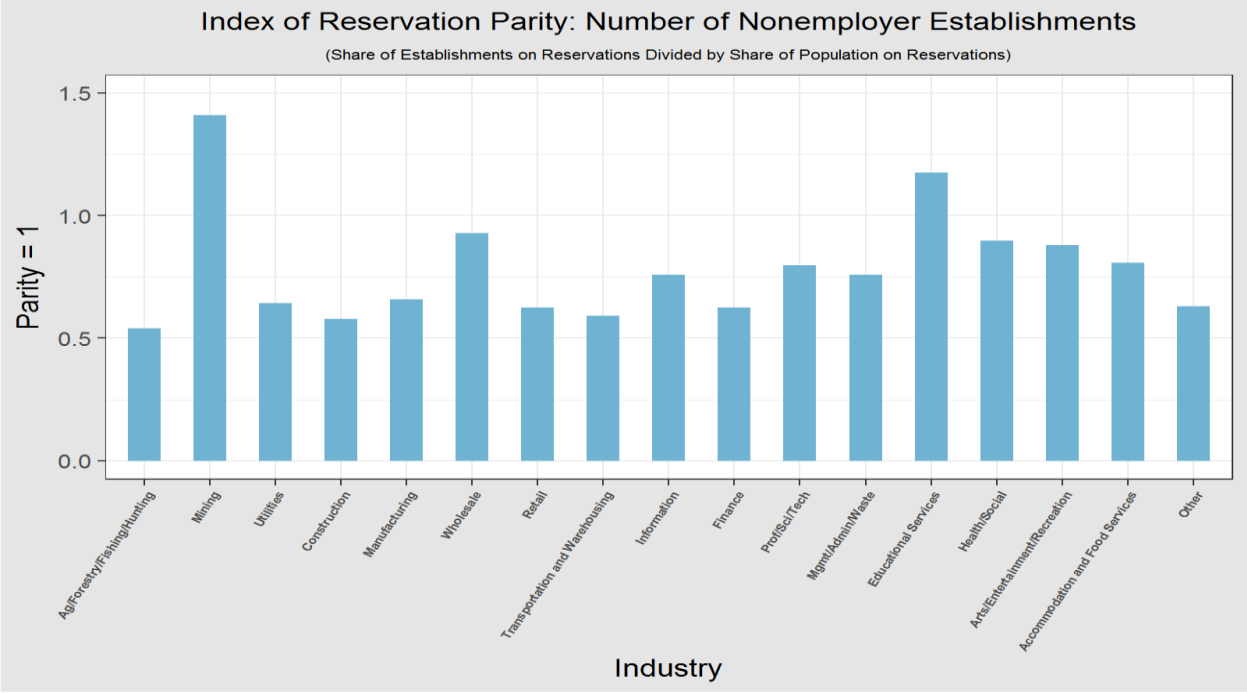


Figure 4: Nonemployer Revenue Shares by Sector and Place

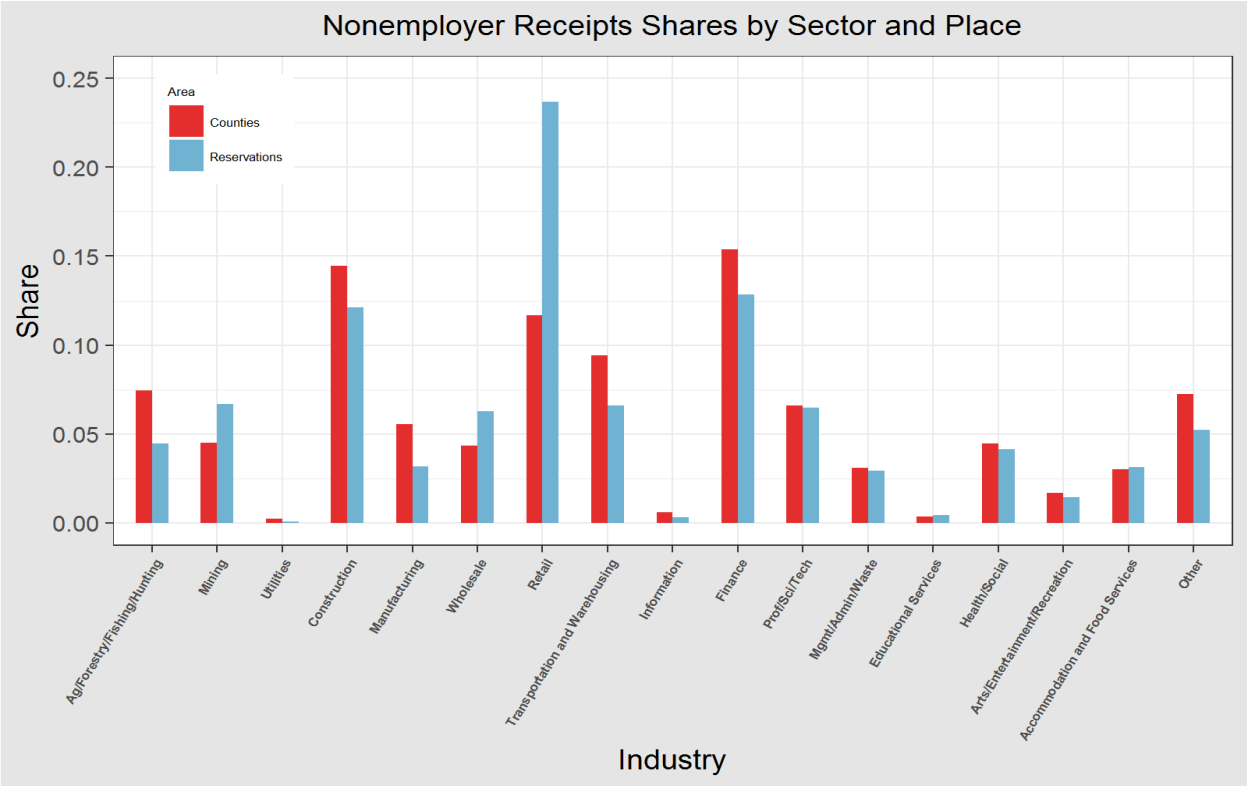


Figure 5: Index of Reservation Parity: Nonemployer Revenue

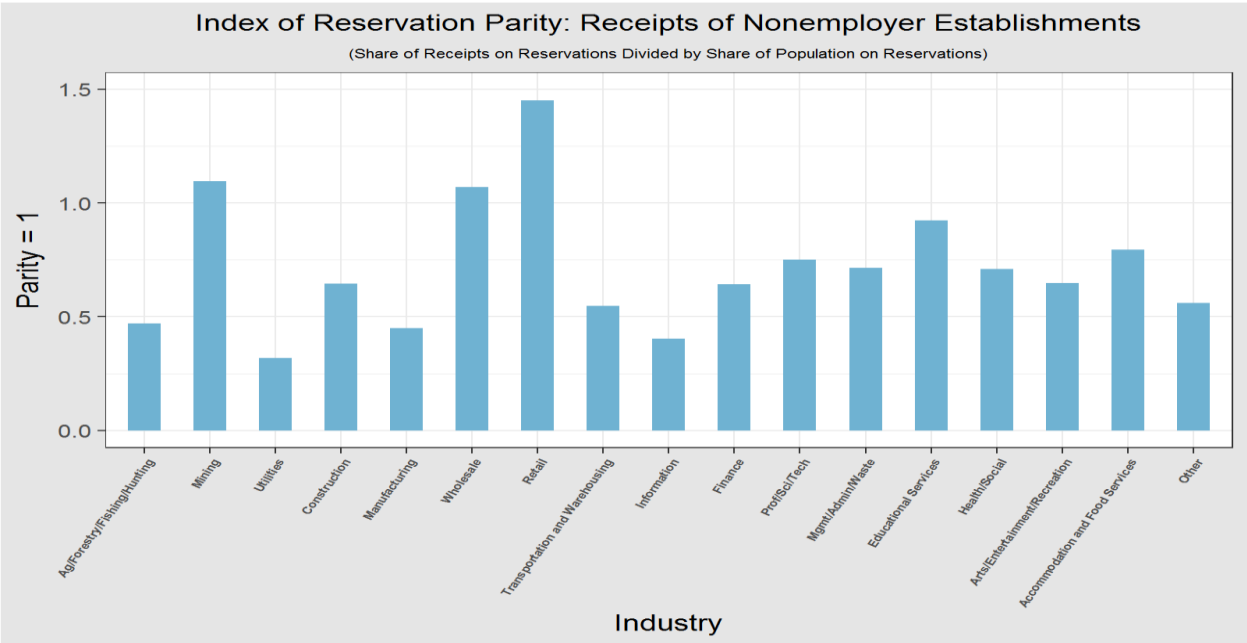


Figure 6: Establishment Shares by Sector and Employer/Nonemployer—Reservations

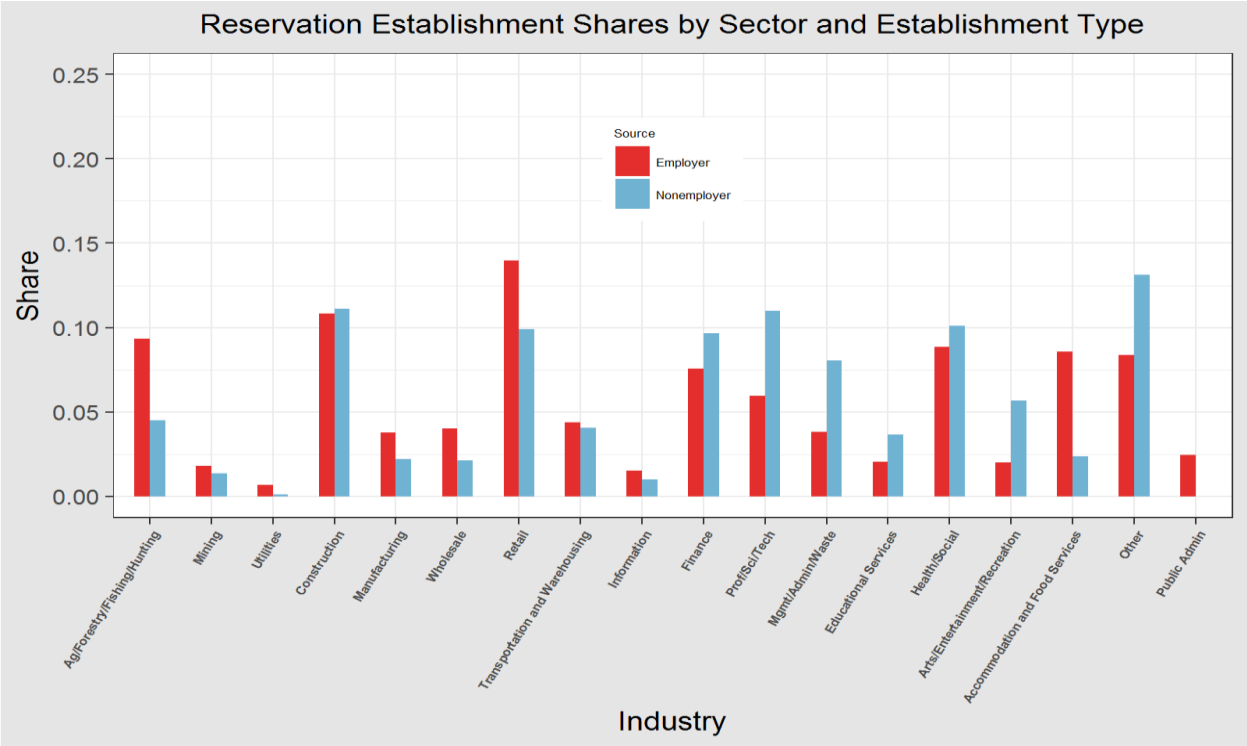


Figure 7: Establishment Shares by Sector and Employer/Nonemployer—County Complements

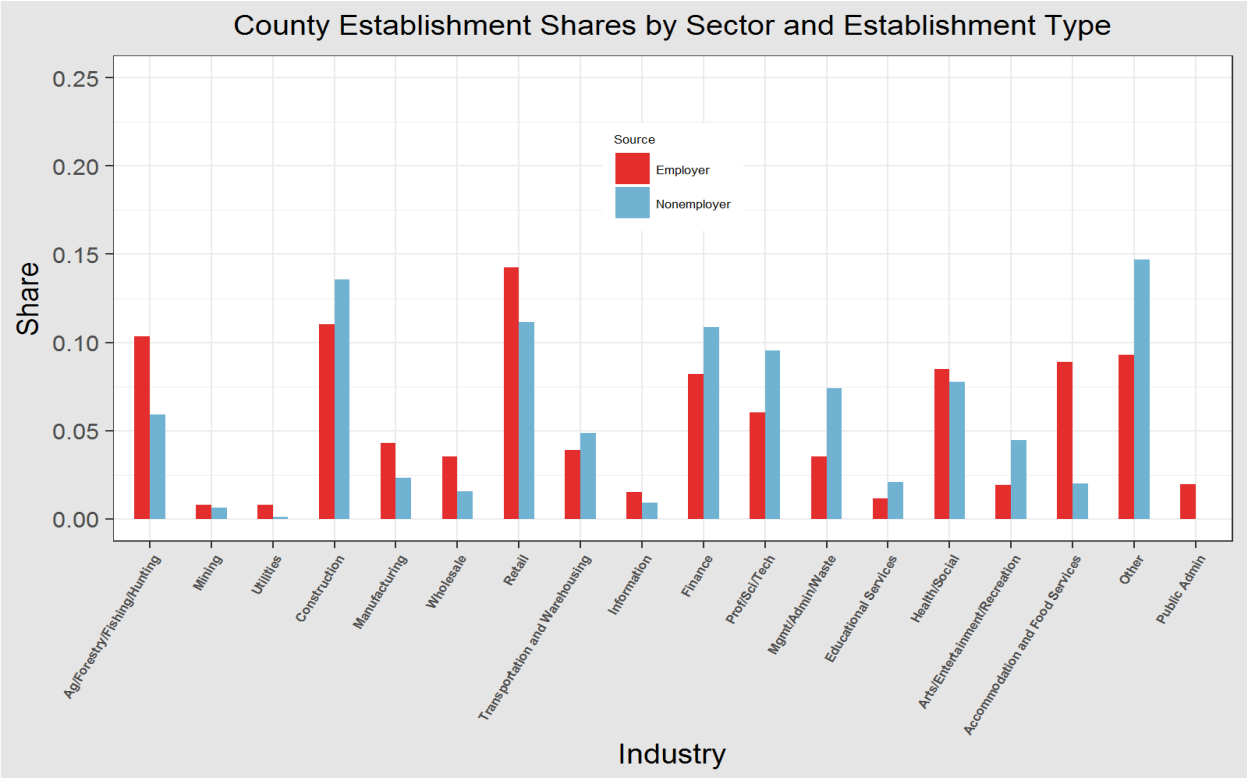


Figure 8: Job Shares by Sector and Employer/Nonemployer—Reservations

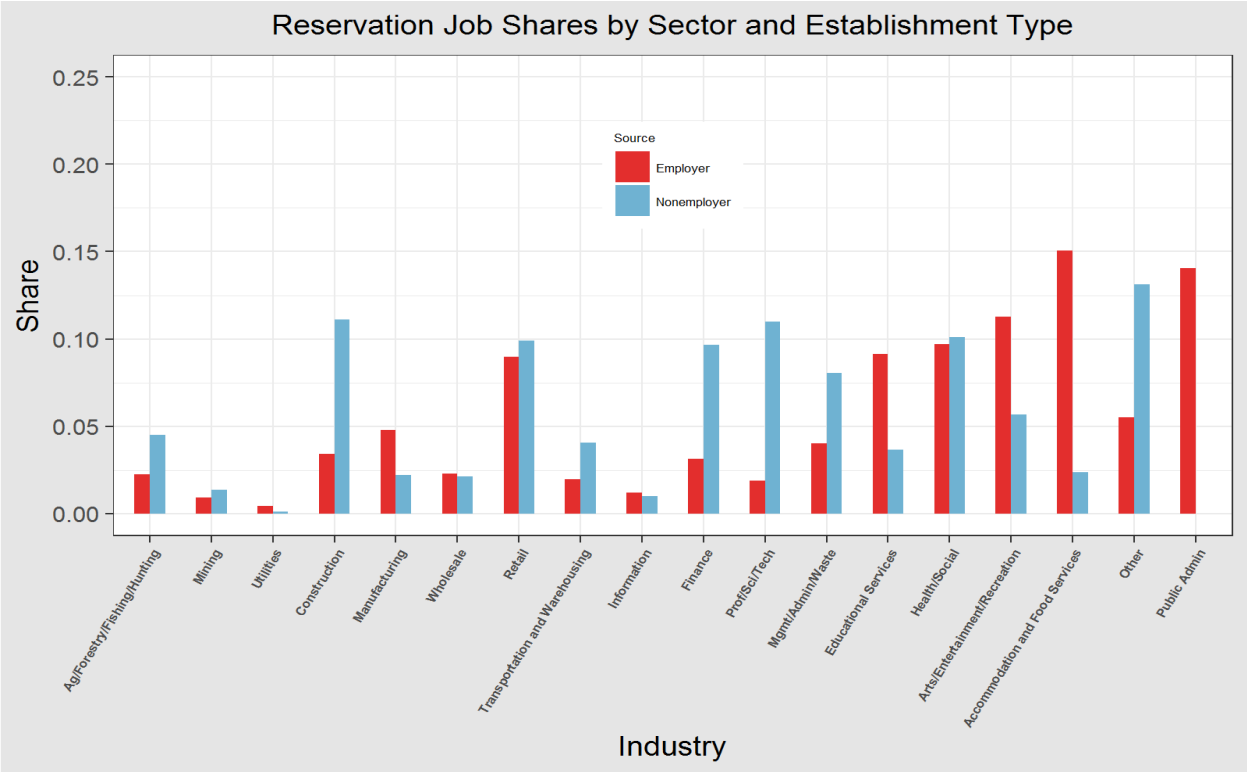


Figure 9: Job Shares by Sector and Employer/Nonemployer—County Complements

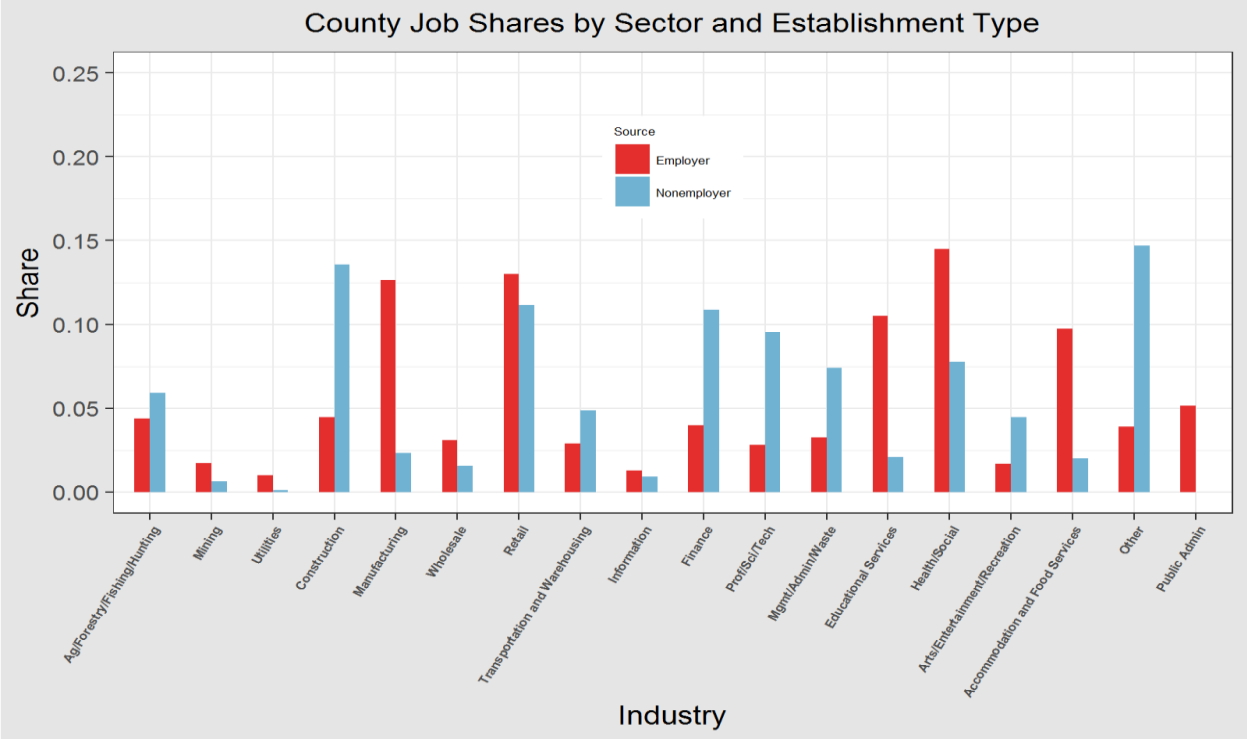


Figure 10: Employer-plus-Nonemployer Establishment Shares by Sector—Reservations

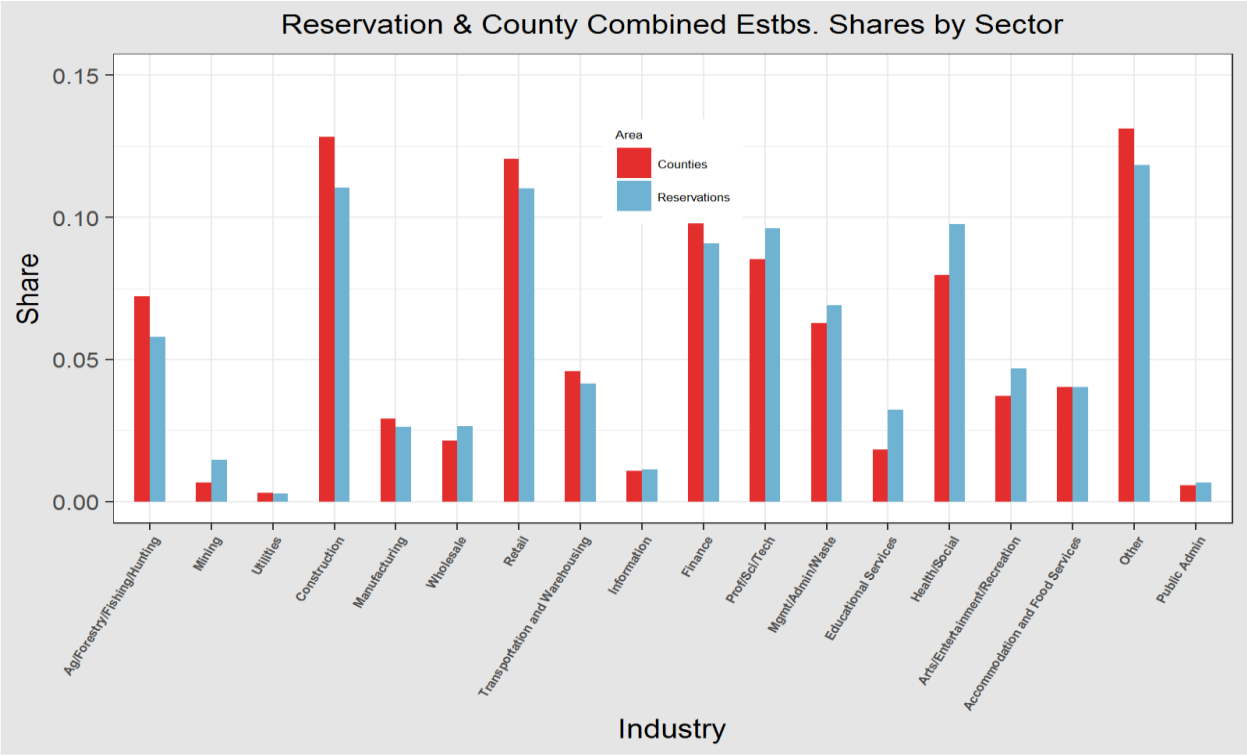


Figure 11: Reservation Employer-plus-Nonemployer Establishment Parity Indices, by Sector

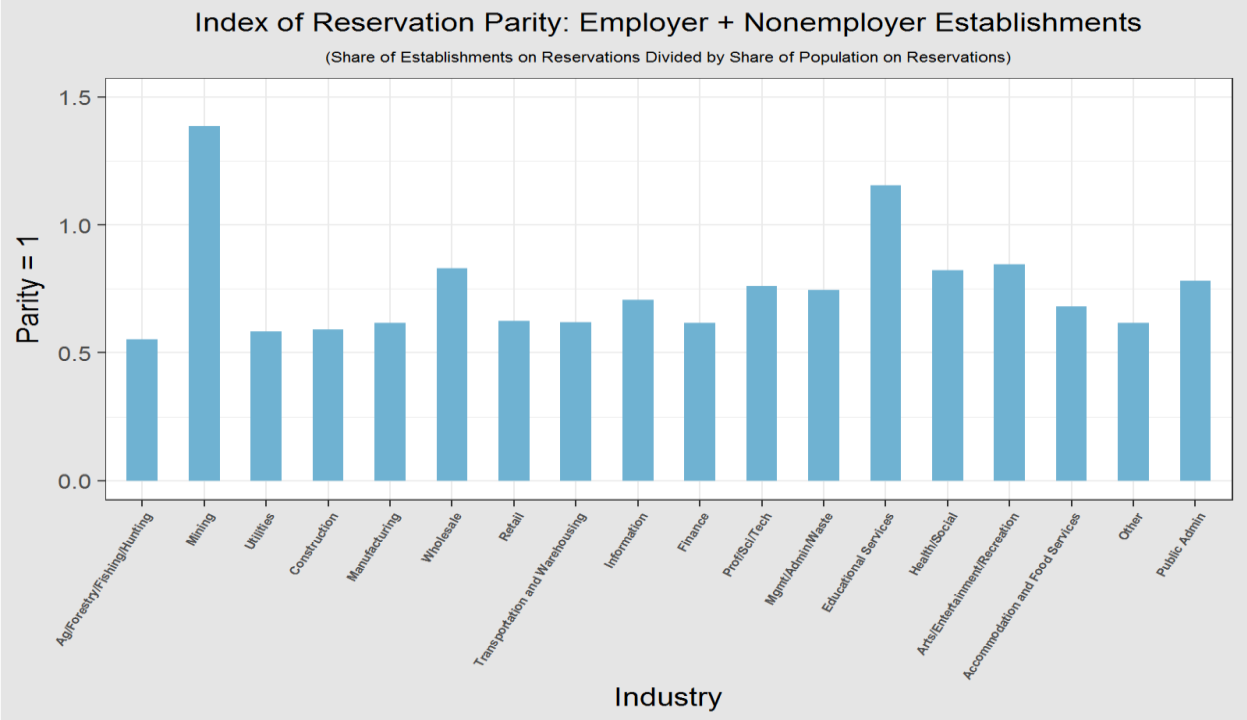


Figure 12: Employer-plus-Nonemployer Job Shares by Sector—Reservations and Counties

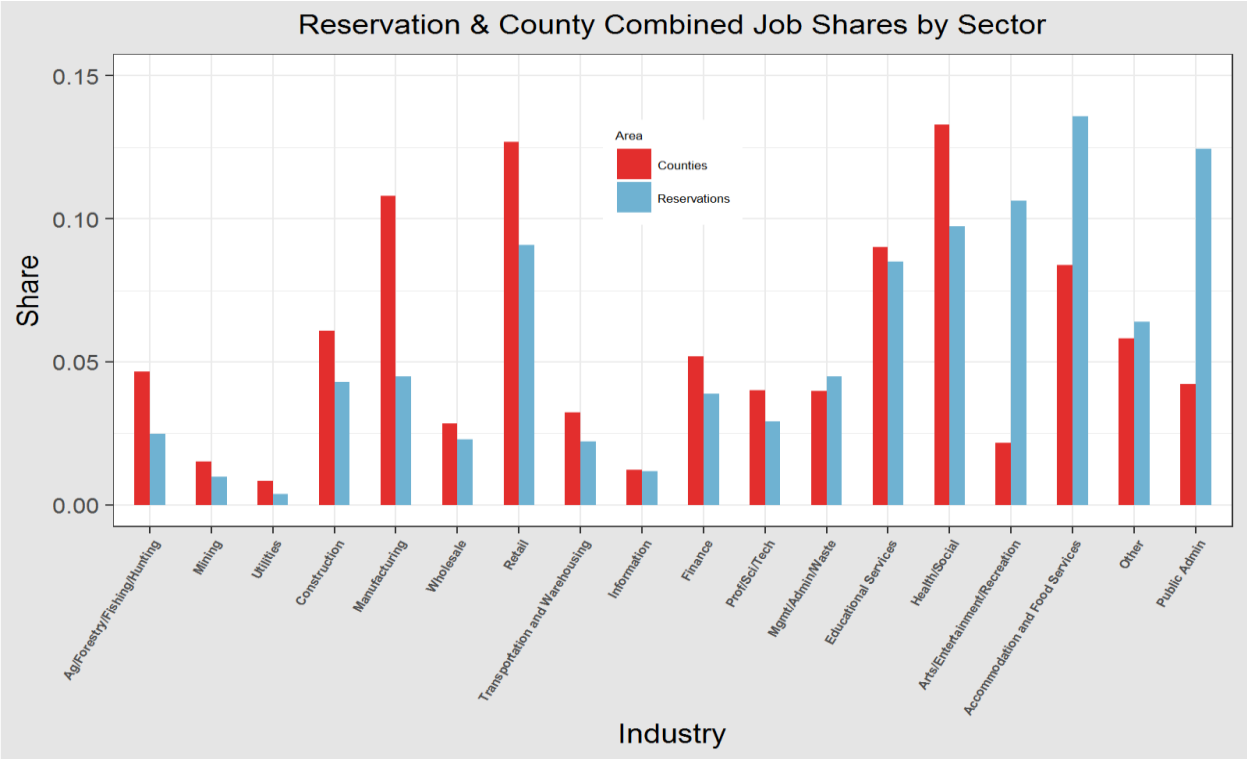


Figure 13: Reservation Employer-plus-Nonemployer Job Parity Indices, by Sector

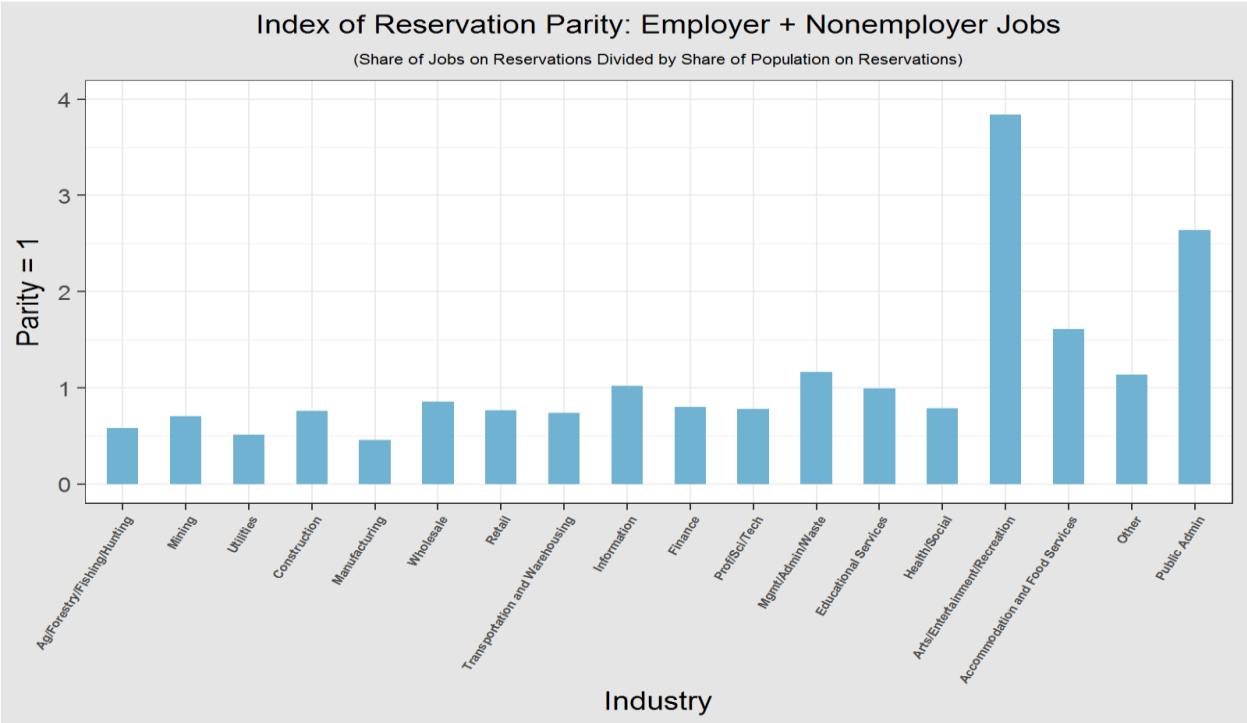


Figure 14: Establishments in the Agriculture, Forestry, Fisheries, and Hunting Industry

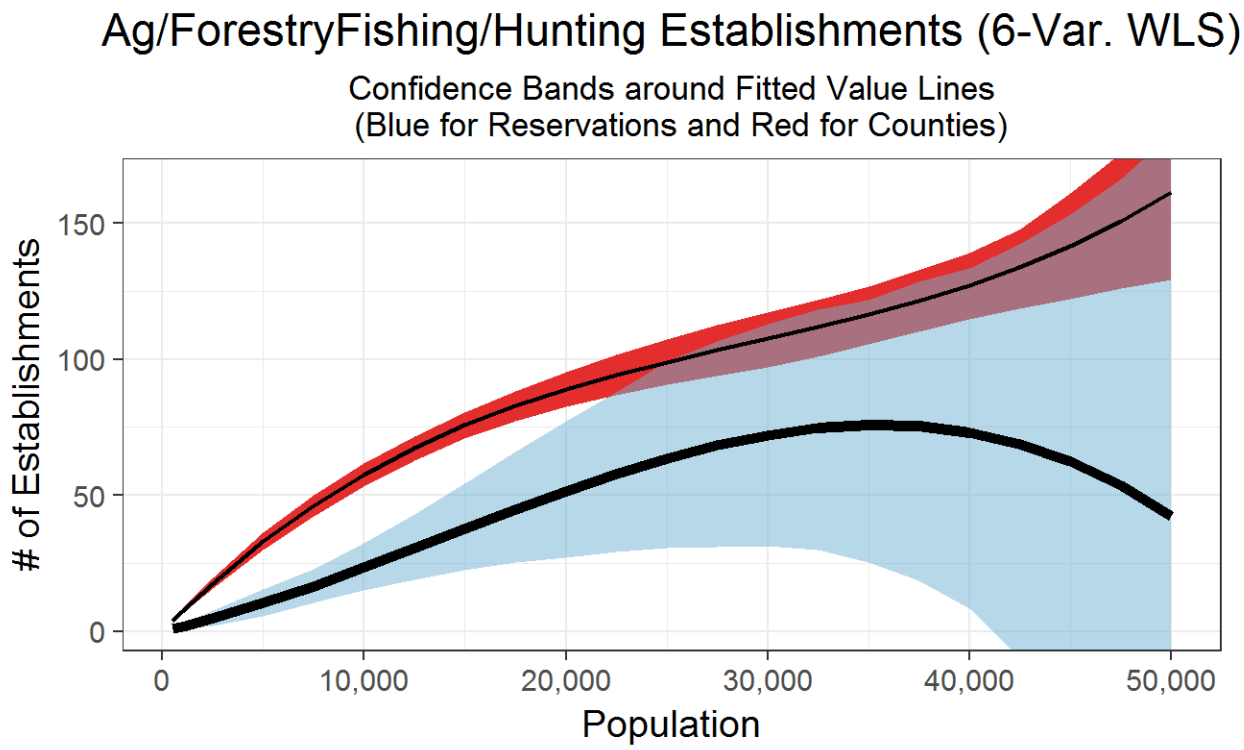


Figure 15: Revenue in the Agriculture, Forestry, Fisheries, and Hunting Industry